CLAIMS

1. A pharmaceutical composition, comprising starch granules containing at least one fusion polypeptide containing :

– in the N-terminal position :

* the peptide sequence SEQ ID NO : 3 corresponding to the granule bound starch synthase GBSSI of *Chlamydomonas reinhardtii* in the form of pre-protein of 708 amino acids, or the sequence SEQ ID NO : 5 corresponding to the GBSSI of *Chlamydomonas reinhardtii* in the form of mature protein of 651 amino acids, said sequences being encoded by nucleotide sequences SEQ ID NO : 2, and 4 respectively, or by a nucleotide sequence derived by degeneration of the genetic code of the aforementioned nucleotide sequences, and coding for the aforementioned pre-GBSSI or GBSSI of *Chlamydomonas reinhardtii*,

* or a fragment of the GBSSI of *Chlamydomonas reinhardtii* represented by SEQ ID NO : 3, in which the amino acid of the amino terminal end corresponds to that located in one of the positions 1 to 58 of SEQ ID NO : 3, and in which the amino acid of the carboxy terminal end corresponds to that located in one of the positions 495 to 708 of SEQ ID NO : 3,

– and, in the C-terminal position, a peptide or polypeptide of interest,

the C-terminal part of the amino acid sequence of the GBSSI or fragment thereof mentioned above, thus being bound to the N-terminal part of the peptide sequence of interest, the said fusion polypeptide being encoded by a recombinant nucleotide sequence containing in the 5'→3' direction, a nucleotide sequence coding for said *Chlamydomonas reinhardti* GBSSI or fragment thereof, the said nucleotide sequence coding for this enzyme being positioned upstream of a nucleotide sequence coding for the peptide or polypeptide of interest, the peptide of interest in the said fusion polypeptides possessing a defined therapeutic effect.

2. A pharmaceutical composition according to claim 1 characterized in that fragment of the GBSSI of *Chlamydomonas reinhardtii* represented by SEQ ID NO : 3, is :

. the sequence SEQ ID NO : 7 corresponding to a fragment of 438 amino acids of the peptide sequence of the GBSSI of *Chlamydomonas reinhardtii*,

. the sequence SEQ ID NO : 9 corresponding to a fragment of 531 amino acids of the peptide sequence of the GBSSI of *Chlamydomonas reinhardtii*,

said sequences being encoded by nucleotide sequences SEQ ID NO : 6 and 8 respectively , or by a nucleotide sequence derived by degeneration of the genetic code of the aforementioned nucleotide sequences, and coding for the aforementioned GBSSI fragments of *Chlamydomonas reinhardtii*.

3. A pharmaceutical composition according to claim 1 characterized in that the peptide or polypeptide of interest is selected from:

– those encoding biologically active peptides, especially peptides of therapeutic interest or that can be used in the agricultural and food industry, or

– those encoding enzymes that are able to transform starch, such as enzymes that interact with α-glucans including various hydrolases, phosphorylases, α-1,4 glucanotransferases, branching enzymes, amylases, and especially heat-resistant hydrolases obtained from extremophiles such as archaebacteria that are active at temperatures above 40°C.

4. A pharmaceutical composition according to claim 1 characterized in that the fusion polypeptide contains a cleavage site positioned between the starch synthase, and the polypeptide of interest.

5. A pharmaceutical composition according to claim 1, wherein the diameter of the starch granules being between about 0.1 µm and several tens of µm, and the proportion by weight of the fusion polypeptides in these granules being between about 0.1% and 1%.

6. A pharmaceutical composition comprising one or more fusion polypeptides containing :

– in the N-terminal position :

* the peptide sequence SEQ ID NO : 3 corresponding to the granule bound starch synthase GBSSI of *Chlamydomonas reinhardtii* in the form of pre-protein of 708 amino acids, or the sequence SEQ ID NO : 5 corresponding to the GBSSI of *Chlamydomonas reinhardtii* in the form of mature protein of 651 amino acids, said sequences being encoded by nucleotide sequences SEQ ID NO : 2, and 4 respectively,

or by a nucleotide sequence derived by degeneration of the genetic code of the aforementioned nucleotide sequences, and coding for the aforementioned pre-GBSSI or GBSSI of *Chlamydomonas reinhardtii*,

* or a fragment of the GBSSI of *Chlamydomonas reinhardtii* represented by SEQ ID NO : 3, in which the amino acid of the amino terminal end corresponds to that located in one of the positions 1 to 58 of SEQ ID NO : 3, and in which the amino acid of the carboxy terminal end corresponds to that located in one of the positions 495 to 708 of SEQ ID NO : 3,

– and, in the C-terminal position, a peptide or polypeptide of interest,

the C-terminal part of the amino acid sequence of the GBSSI or fragment thereof mentioned above, thus being bound to the N-terminal part of the peptide sequence of interest, the said fusion polypeptide being encoded by a recombinant nucleotide sequence containing in the 5'→3' direction, a nucleotide sequence coding for said *Chlamydomonas reinhardti* GBSSI or fragment thereof, the said nucleotide sequence coding for this enzyme being positioned upstream of a nucleotide sequence coding for the peptide or polypeptide of interest, the peptide of interest in the said fusion polypeptides possessing a defined therapeutic effect.

7. A pharmaceutical composition according to claim 6 characterized in that fragment of the GBSSI of *Chlamydomonas reinhardtii* represented by SEQ ID NO : 3, is :

. the sequence SEQ ID NO : 7 corresponding to a fragment of 438 amino acids of the peptide sequence of the GBSSI of *Chlamydomonas reinhardtii*,

. the sequence SEQ ID NO : 9 corresponding to a fragment of 531 amino acids of the peptide sequence of the GBSSI of *Chlamydomonas reinhardtii*,

said sequences being encoded by nucleotide sequences SEQ ID NO : 6 and 8 respectively , or by a nucleotide sequence derived by degeneration of the genetic code of the aforementioned nucleotide sequences, and coding for the aforementioned GBSSI fragments of *Chlamydomonas reinhardtii*.

8. A pharmaceutical composition according to claim 6 characterized in that the peptide or polypeptide of interest is selected from:

– those encoding biologically active peptides, especially peptides of therapeutic interest or that can be used in the agricultural and food industry, or

– those encoding enzymes that are able to transform starch, such as enzymes that interact with α-glucans including various hydrolases, phosphorylases, α-1,4 glucanotransferases, branching enzymes, amylases, and especially heat-resistant hydrolases obtained from extremophiles such as archaebacteria that are active at temperatures above 40°C.

9. A pharmaceutical composition according to claim 6 characterized in that the fusion polypeptide contains a cleavage site positioned between the starch synthase, and the polypeptide of interest.